EXHIBIT A

TRANSCRIPT PAGES 386 - 498

REDACTED

REDACTED

Page 506

Q: So in your view you cannot measure the resistance of insulators?

A: I think I just explained what I meant, given expensive equipment in principle one can measure resistance of a hundred mega, mega, mega ohms, it doesn't make sense, so theoretically one could do it, but for all practical purposes you wouldn't want to.

Q: You said that ITO is a conductor and you also said it's a semiconductor; correct?

A: I said it's a conductor, a semiconductor that happens to be conductive.

Q: Have you ever seen a standard textbook that refers to the ITO that is commercially sold to LCD manufacturers as anything but a conductor?

A: I'm not sure. I have read many, many articles about ITO that were written based on studies done by physicists and chemist in academia and elsewhere and they all refer to ITO as a semiconductor. In fact, they draw the band diagram that can be measured by ITO and it shows the bottom of the conduction band and the top of the valance band and a band gap of approximately

Page 507

3.75 electron volts, and that's a semiconductor.

Q: And you have not provided any of these treatises in support of your opinion that ITO is a semiconductor?

A: I would be happy to do that, but probably it's not legal to do it at this point, but there are many such articles.

Q: And you said that you could not calculate the resistance in the ITO columns that are found in the guard ring on which you are basing your opinion that CPT's product meets this resistance element in Claim 1?

A: I said it would be difficult to calculate number one because in reality, you don't necessarily have the exact structure that is depicted in the arrays and in the artwork.

For example, I mentioned that those holes that go through the insulators, when the ITO is evaporated down, it might just stick on the inside of one hole and you only have a very thin path of ITO, so in actuality, you don't know what the actual resistance will be. In principle if you have a flat layer of ITO, you can calculate its resistance.

Page 508

Q: Are you saying that you would not be — generally speaking if you assumed that the ITO filled the entire hole, you would be able to calculate that resistance; correct?

A: If you knew the exact geometry of the ITO, you would be able to calculate the resistance.

Q: Are you able to calculate what the maximum resistance would be in one of those ITO holes that fills the ITO holes as you described to the jury in the CPT guard ring?

A: No, because in practicality I don't know. There are many holes there as you pointed out yesterday and I don't know to what degree they're filled with ITO or not, so the maximum is a mega ohm or a hundred mega ohms. I don't know what it would be because in actuality we don't have an actual photograph of how those holes are filled, all we have is the artwork that describes how they ought to look.

Q: So in your view, though, the maximum resistance possible in one of those ITO holes if it were filled is a hundred mega ohms?

A: I didn't say that. If it was

Page 509

fully filled with ITO, you could calculate the resistance, and it's a three-dimensional geometry, so you would have to go through some exercise to calculate it, but it would be calculable.

Q: And do you have any idea what that would be?

A: I haven't done the calculation.

Q: It wouldn't be a hundred mega ohms, would it?

A: If it were filled, no, it would be quit a bit less than that.

Q: It would be quit a bit less than even a hundred K ohm; correct?

A: It might very well be.

Q: In fact, it would be substantially less than 10 K ohms; correct?

A: You're asking me for numbers, and in the reality I can't really say what those numbers are. I think the point is that it's a magnitude of resistance and the way Chunghwa makes their products to solve the problem of providing that resistance.

THE COURT: This is a good time to

Page 510

take our afternoon recess for fifteen minutes.

MS. CORBIN: Okay.

(Jury leaving the courtroom at 3:08 p.m.)

THE COURT: All right. We'll be in recess for fifteen minutes.

(A brief recess was taken.)

THE REPORTER: All rise.

THE COURT: All right. The jury's on its way in.

(Jury entering the courtroom at 3:31 p.m.)

THE COURT: All right. Be seated, please.

BY MS. CORBIN:

Q: Hi, Mr. Schlam. I want to stop where we are for a moment and have you refer to your Exhibit 5 from your infringement report, which was a listing of accused CPT modules, and an indication of the claims that you believed they infringe. And I just want to clarify this, because Mr. Cobb relies on your Exhibit 5 in his damages report.

So it is your opinion that the

Page 511

modules listed — CPT modules listed next to reference Numbers 1 through 14, 17, and 39 would be on the next page, do not infringe either Claim 1 or Claim 8; correct?

A: That's correct.

Q: And it is also your opinion that the modules, the CPT modules listed at reference Numbers 18 through 22, 24 through 25, 27, 30, 39 to 40 and 42 to 43, which would be on this page, do not infringe Claim 8; correct?

A: Correct.

Q: And some of these reference numbers refer to modules that are meant to indicate an entire series of products; correct?

For example —

A: Yes, according — go ahead.

Q: For example, if you look at Line 21, the 141XC and the 141XF, those are intended to refer to the entire series of modules that start with 141XC; correct?

A: Well, if you look at the chart

Chunghwa specifies the resistance in the TFTs by defining the TFTs and showing the ratio of the channel width and length, that's a specification of the resistance. One can determine the resistance at

Page 499

any voltage level given that specification.

Q: And if we look at the first portion of that definition that the Court has provided, a circuit component that has a specified resistance to the flow of electric current, in your view a specified resistance does not require that it is a constant resistance regardless of the voltage level; correct?

A: Yeah. The Court didn't say it has to be constant. It said it had to be specified.

Q: So, in other words, you were construing the term to mean that it would cover anything that you could measure or calculate any device in which you could measure or calculate the resistance at a particular point in time?

A: Any device that had a resistance, yeah. You can't measure a calculator. It would be probably difficult to know what the resistance is.

Q: And under your definition, you can specify the resistance for any electrical component; right?

A: Well, some electrical components

Page 500

just don't have resistance. Super crude metal does not have resistance.

So there are some components that don't have resistance. Metals, conductors semiconductors all have resistance.

Q: So just to be clear, in your view, the meaning of a specified resistance means that it can include components that have a range of resistances at various different voltages?

A: Sure. Again, Chunghwa specifies the resistance of their TFTs on those array specifications that we showed. It says specification.

It says TFT resistance.

Q: Well, you're not making — basing your conclusion about CPT's product being a resistance based on a label that says TFT resistance, are you?

A: I drew that opinion beforehand. But the Chunghwa specification specifies the resistance.

So even Chunghwa, I think, agrees.

Q: In fact, the way in which CPT specifies its diodes is only by width and by

Page 501

length; isn't that correct?

A: Yes. That's how most people do it.

Q: And that's true — you've seen all the specifications for all the CPT products; correct, that you have accused of infringement?

A: Yes. I've seen all the array specs, yeah.

Q: And every one of those specs indicates that the only way in which CPT specifies its diode is by width and length?

A: I think so. Yes. And that does determine the characteristics of a diode.

Q: And it is true, isn't it, that if you only specified the width of and the length of a diode, you cannot know for certain that at any given voltage what the resistance is going to be?

A: Well, there's more to a full specification. If you were designing a diode, you need to know thicknesses and nature of the materials. You need to know a lot more.

And you see in the Chunghwa array

Page 502

specification, they put the indication of width to length, because it gives them a good indication of what that resistance is going to be.

You can't necessarily calculate it to the — to the hundredth order. But it's not important to be able to do that.

In fact, they designate the width and length for the inner guard ring TFT and for the outer guard ring TFT. And those width and length ratios are different.

So they're specifying different resistances for the inner guard ring and the outer guard ring.

Q: You're saying they specify different widths and lengths for the diodes that are in the inner guard and the diodes that are in the outer guard?

A: Typically, yes.

Q: But I agree that if you only specified the width and length, you cannot know for certain at any given voltage what the resistance of that diode is going to be?

A: Well, again, this is an array

Page 503

specification. It is not a complete detailed specification of every component.

It gives the designer an idea of what's there. It shows the different materials, the thicknesses of the materials.

You know, it doesn't give the exact dimension, but it gives the designer an understanding that the resistance of this diode is going to be higher than the resistance of that diode.

Q: I'd like to read from your deposition at Page 161 to Page 162, Line 3.

"Question: But if you only specified the width and the length, you cannot know for certain that any given voltage, what the resistance is going to be?

"Answer: Just those two numbers will not give you — is not enough to give you the resistance. Sorry, the exact resistance.

A: I think that's what I just said, yes.

Q: And you consider the word, referring back again to the Court's claim construction order, and the second part of that,

Page 504

the circuit component that has a specified resistance to the flow of electric current and is used to minimize the current surge from electrostatic discharge.

In forming your infringement opinion, you believe and apply that the meaning to the word minimize, that it — the electric current — sorry. Strike that.

When considering your infringement opinion, and applying this definition, you understood the word minimize to be reduce; correct?

A: Yes. And as I pointed out earlier, it means reduce or minimize at the TFT that's being protected. So it minimizes, so that a TFT that is undergoing an electrostatic charge will not be damaged.

It has to reduce the current that would go through that TFT. That's why they're all interconnected to disperse that current, to reduce it at that location where the damage can occur.

Q: And any component will reduce the current when electric — when electricity is

Page 505

flowing through it; correct?

A: Say that again, please.

Q: In other words, every circuit component has a resistance; right?

A: Not every circuit component. The circuit components we're talking about, conductors, resistors, semiconductors, all have a resistance. Yes.

Q: So insulators also have a resistance; correct?

Page 1301

Q: On cross-examination, counsel suggested that there was some connection between the diodes that you left out of the drawing. Do you recall that?

A: Yes.

Q: Is there a connection between these diodes that you omitted from this figure?

A: Actually the connection is made through the outer ring on this area.

Q: And there is no separate connection between the diodes other than through the outer guard ring as you just pointed to with the pointer?

A: In the drawing, possibly you can tell that some other layers are joined together. But the way that I put it in the simple explanation is to show that this way is the most complete way.

MR. KRAMER: Thank you very much. No further questions.

THE COURT: All right. Thank you. You may step down.

MR. RHODES: Your Honor, as our next witness, we call Mr. Youngwoo Cho. And

Page 1302

this will be a short videotape deposition.

Mr. Cho is an LPL employee.

(Beginning of video excerpt:)

Q: Does the patent team conduct regular patent searches of competitors?

A: It does not.

Q: Has the patent team ever analyzed any patents owned by a competitor?

A: Yes, but it was in the past, on a number of occasions.

Q: Mr. Cho, I'd like you to use that piece of paper, the same piece of paper, I haven't written anything on it, to draw a diagram how LPL's products connecting the outer ring to the gate lines, I ask you to draw the diagram according to your understanding in as much detail as possible that reflects a coupling between the outer guard ring and the gate line in LPL products.

A: I'm not good at drawings, but I will give it a try.

Q: Go ahead.

A: This is my understanding and this is the gate lines and this is the guard ring and

Page 1303

this is the resistance, via resistance this is connected like this.

Q: Can you mark the gate lines with gate lines?

A: In English?

Q: English, yes. Can you mark the resistance with resistance?

MR. LI: All right. Let's mark that as Cho Exhibit 5.

Q: Mr. Cho, I see a line connecting four gate lines together. Does that mean all the gate lines connect together by that line?

A: Which one were you referring to?

Q: I see four gate lines on Exhibit 5; correct?

A: Yes.

Q: And there's a horizontal — there's a line, let's mark this line with the letter A so we can talk about it. Can you mark that line with the letter A?

Does line A connect all the gate lines together in LPL products?

THE WITNESS: Yes, but my thinking is

Page 1304

that these are connected based on my engineering experience, but it does not relate to any legal interpretation.

Q: And you have testified you do not know the structure of resistance on Exhibit 5; correct?

A: Correct. I told you that I don't have specific or clear recollection of that.

Q: Is line A a line of conductive material?

A: Yes.

Q: What's the reason to connect all the gate lines with line A?

A: My understanding is that there are two reasons: First reason is that if the electrostatic occurs, these lines are there to distribute and discharge the said electrostatic. And number two reason is that this is for the purpose of testing so that we could apply a voltage to this line and use this is a — for testing purposes.

Q: So for testing purposes, if you apply a voltage on one gate line, that voltage will be applied to all the gate lines; correct?

Page 1305

A: As far as I understand that, yes. That is correct.

Q: Does LPL use a similar configuration as Exhibit 5 for its source line coupling to the outer guard ring?

A: Yes.

(Conclusion of videotape excerpt:)

MR. RHODES: Your Honor, we move into evidence DTX 001.

THE COURT: All right. It will be admitted subject to anybody's objection.

MR. BONO: Your Honor, there was a section of the deposition that the defendants were supposed to read in, and they neglected to do so. And it's a significant piece of testimony prior to the drawing being made.

This is lines 137, 4 through 137, 11.

THE COURT: Let's see if we can get it played, if you have that.

MS. CORBIN: Could you give me those again?

MR. BONO: 137, 4 to 137, 11.

MS. CORBIN: You say our

Page 1306

designation or yours?

MR. BONO: It was in your designation.

MS. CORBIN: Okay. I apologize, Your Honor. Can we just read the few lines into the record?

THE COURT: Sure. Yes.

MR. BONO: I would represent that this testimony was prior to Mr. Cho making the drawing —

MS. CORBIN: Okay.

MR. BONO: — that was shown.

MS. CORBIN: Okay. So the question was: "Correct, Mr. Cho?

"Answer: I don't know to what level of detail you want me to draw this diagram. And I don't know whether this would be accurate or not. But based on what I heard from engineers, the engineers within our company, the outer guard ring is connected to the gate lines via resistance. And solely based on that, I don't know how accurately I can draw this diagram."

THE COURT: All right. Thank you.

Page 1307

MR. RHODES: Your Honor, our next witness is going to be a video of Scott Holmberg. Scott Holmberg is the listed inventor on the '002 patent.

And as an additional matter, Your Honor, we do have one demonstrative, which is just Claim 1 of the patent that we'd like to put up over here while we play this deposition, so that they can refer to that.

THE COURT: Sure. You can do that.

MR. RHODES: It is going to be about two hours, and we apologize for that, but he's not available and we need to put this into evidence.

(Beginning of video excerpt.)

THE VIDEOGRAPHER: This is the digital videotape deposition of Scott H. Holmberg, being taken on behalf of

Q: Can you get the same functionality from your outer guard ring invention if you replaced the resistor with a switching element?

A: As I just stated, that — my gut reaction is I could put a switching element out there or a diode and make it work. But I'd have to do a full analysis on that panel, you know, to make sure that you could do that, and it may have some limitations.

When you say "a switching element," or "a diode," it may have some constraints on it, you know, because of the high voltage.

What you don't want to do is end up shorting that out or blowing that out, so it may work, but, you know, it may have to be

Page 1328

designed to work.

Again, that — you'd have to do an analysis on that to see if it could be done.

Q: Did you assist in the preparation of your patent application for the '002 patent?

A: Yes.

Q: And did you review the claims that were submitted with your patent application to the patent office in the initial application?

A: Yes, I read through them.

Q: Perhaps, we could just look at Claim 1 of your '002 patent, which is Exhibit 106. It is column eight — I'm sorry — the bottom of column eight.

A: Okay.

Q: Right. But the — the reason that you interconnect substantially all of said row lines to one another and substantially all of the column lines to one another is to attempt to protect each of the pixels from electrostatic discharge.

A: That is one of the reasons.

Q: What are the other reasons?

A: Testing of — testing.

Page 1329

Q: And could you explain that?

A: You know, whether you hook them in serpentine or you hook them in all parallel on one side, you want to be able to use the minimum number of contacts to drive the display so that you can test it to make sure that there is no shorts or open lines in a display.

Q: And where you interconnect substantially all of the row lines to one another and substantially all of the column lines to one another, you in fact only need two contacts in order to test the entire array; is that right?

A: With two contacts, you could test if there is any shorts in the panel. You would need other contacts to test for any opens in a display.

Q: And when — what do you mean by "any shorts in the panel?"

A: Any areas where you may have a short or a very low resistance between the row line and the column line.

Q: And what —

A: That could be through the source,

Page 1330

you know, to the gate of the transistor or a crossover point of the row line and the column line.

Q: And if you refer to the Exhibit 105 which is the one with the two schematics, if you look at the configuration on the lower portion of the page, is it possible — if you assume that the source lines are connected to the outer guard ring in the same method as the gate lines are illustrated here, is it possible to check for any shorts in the array using only two contacts?

THE WITNESS: I don't think there's enough information there to — without seeing the whole panel represented, I couldn't tell.

THE WITNESS: I — you say a short, I only see gate lines. Are you saying short — gate to gate short? Column to gate short?

(Interruption of videotape excerpt:)

MR. RHODES: Your Honor, can we take a brief recess while we figure out the problem with this?

THE COURT: Sure. We'll take a

Page 1331

recess while we get the technical aspects worked out.

(Jury leaving the courtroom at 2:16 16 p.m.)

THE COURT: All right. We'll be in recess. You'll let my law clerk know?

MR. RHODES: Yes, Your Honor.

THE CLERK: All rise.

(A brief recess was taken.)

THE CLERK: All rise.

THE COURT: All right.

MR. RHODES: Your Honor, I think Ms. Corbin would like to address the matter that came up this morning just for clarification.

MS. CORBIN: Particularly, Your Honor, be seated, please. No, not you, Ms. Corbin. You're on.

MS. CORBIN: All right. Following instructions.

Okay. I'm particularly concerned about the letter, and I don't know if we need to clarify, but I didn't want to have to interrupt the jury again since we just interrupted them.

Now, with respect to Dr. Howard's

Page 1332

testimony, as it relates to what is not — what's characterized as a reargue of the claims construction, but which in reality is foundation and testimony regarding infringement under the Doctrine of Equivalents, and this has to do with the function of function, way, result test as applied to the interconnecting requirement, which is Step 3 of Claim 1.

I think, as we've seen in the testimony that's been shown so far from Mr. Holmberg, that even the inventor says the function interconnecting step was this testing. And the nature of that testimony is definitely relevant to Dr. Howard's Doctrine of Equivalents analysis for that step, Step 3 of Claim 1.

And particularly, you know, the '222 patent that they mention here, even as Your Honor acknowledged in Footnote 1 of the memorandum opinion, is incorporated by reference in the inherent part of the specification of the '002 patent. So that was one of the issues, and I just want to make sure that we do plan to proceed with that testimony.

And then the second point had to

Page 1333

do with this going through the claims on the dichotomy of the usage of the terms resistance and shunt switching element as it is described both in the specification and the claims, because it is plaintiff's contention, through Dr. Schlam, that the term resistance, even as defined by Your Honor in Claim 1, encompasses shunt switching elements.

And it is our aim to show that, in fact, that is entirely inconsistent with the whole intended purpose and all the language throughout the specification in the claims that, without exception, the way in which it talks about the gate lines and source lines being coupled to the outer ring, the term resistance is always used.

And when it talks about the coupling of the gate lines and the source lines to the inner ring, shunt switching element is always used.

MR. BONO: Am I being charged time for this?

THE COURT: No, it's their time.

MR. BONO: Thank you. I thought

Page 1334

the Court already ruled on this, and in

lawyer I was against said that he didn't want to argue the settlement of other parties to the liability issue of my plaintiff. And I asked to have all reference to any settlement discussion excluded, but the judge thought it was important immediately to make a decision, and to allow him to talk about it for purposes of aligning the parties, and the testimony came in about settlement, it didn't look so bad, but in the closing argument, what the lawyer did was say, there was things done wrong here and somebody is liable and some people have already paid for that. It sounded real close to me like a violation of 408. I didn't get upset, I just objected. And there are appellant courts even after the post trial motions that will take care of all of this.

What I'm trying to do is let you

Page 1348

try the case the way you want unless you are in a — unless you're offering something that's so obvious that it's like you got to stop the beating because it's occurring right in front of them, but the kind of subtle issues you're arguing, they're kind of by hypothesis or speculation, you may not be doing anything Mr. Bono is saying.

So what I'm trying to convince you, I'm not trying to dissuade you, I'm trying to tell you what the ruling is again, what his argument is, and what the penalty is if it's later found out in the context of this whole trial that you didn't get my order. Okay?

We're going to bring the jury in.

(Jury entering the courtroom at 2:47 p.m.)

THE COURT: All right. I think I have fixed all the technical problems. I have a vast background about this machinery and we should be able to move on from here. And I appreciate your patience as to do parties and the counsel. Thank you very much.

All right. You want to start it

Page 1349

up again.

MR. RHODES: Yes, Your Honor. Thank you for your help.

THE COURT: No problem.

(Videotape Testimony.)

A: With two contacts, you could test if there is any shorts in the panel. You would need other contacts to test for any opens in a display.

Q: And when — what do you mean by "any shorts in the panel"?

A: Any areas where you may have a short, or a short, or a very low resistance between the row line and the column line.

Q: And what —

A: That could be through the source, you know, to the gate of the transistor or a crossover point of the row line and the column line.

Q: And if you refer to the Exhibit 105, which is the one with the two schematics, if you look at the configuration on the lower portion of the page, is it possible — if you assume that the source lines are connected to

Page 1350

the outer guard ring in the same method as the gate lines are illustrated here, is it possible to check for any shorts in the array using only two contacts?

THE WITNESS: I don't think there's enough information there to — without seeing the whole panel represented, I couldn't tell.

THE WITNESS: I — you say a short, I only see gate lines. Are you saying short — gate to gate short? Column to gate short?

I don't — there's not enough information.

Q: I'm using short in the same context that you were using it in the answer just above where you stated, " any areas where you may have a short or low resistance between the row line and the column line".

A: Okay. But that's not represented on this diagram.

Q: What else would you have to know to answer that question?

A: We'd have to see how the columns were hooked together. All I see here is row lines.

Page 1351

Q: Well, I — my question presumed that the row lines were connected to the outer guard ring in exactly the same way as the gate lines are depicted here.

A: There's no column lines here. I don't know how you could test this to — and determine if there's any shorts in the panel without column lines and showing how they're hooked together.

Q: When you say how they're connected together, you mean the source lines to the outer guard ring?

A: Yeah, and what their relation is, how — how they're hooked together. Are they hooked together?

Q: So I'm asking you to assume that the gate — the source lines are connected to the outer guard ring in exactly the same way as these gate lines are depicted, which is each gate line and each source line is individually connected to the outer guard ring through a diode.

A: The way you stated, you couldn't test it.

Page 1352

Q: And why is that?

A: Because everything would be shorted — or basically shorted out.

Q: Meaning shorted to the — to the outer guard ring?

A: Yes.

Q: So if you wanted to test any line, gate line or any source line, you could only test line by line, is that it?

THE WITNESS: I would have to study this, but I can't see how you could test it.

THE WITNESS: Yeah. I don't see how you could test it.

Q: Under that scenario, meaning each gate line separately and each row line separately?

A: Right. What you just described, you couldn't test it —

Q: Well, in any event —

A: — without probing every line, because there would be a sneak path.

Q: Right. In order to test it, you would have to probe each line independently using the configuration I described?

Page 1353

A: Yes.

Q: In Step 4, which states, "forming an outer electrostatic discharge guard ring on said substrate coupled with said interconnected row and column lines via a resistance to provide protection from electrostatic discharges between said row and column activation lines during manufacture of the displays".

If we refer, again, to Exhibit 105 and to the schematic that is on the upper portion of the page, it has an outer electrostatic discharge guard ring; correct?

A: Okay. Which claim was that, again?

Q: We're in Claim 1, Step 4, which is at the top of the page, Column 9.

A: Okay.

Q: Not in the first element, but on that page, the second one that starts, " forming an outer electrostatic discharge guard ring".

A: Okay.

Q: And I'm going to refer to that whole element up to the point where it says, "removing said outer guard ring"

Page 1400

see that — it says, "In the course of this engagement, our firm and you may identify areas for which we will require your services," do you see that, the first paragraph?

A: Yes.

Q: It says, "such as providing expert advice and consultation regarding —" and it identifies a couple of topics; first, conception, reduction to practice, and interpretations of U.S. Patent Number 102 — the '002 patent. You counter-signed this agreement thereby agreeing to provide these services for McKenna, Long & Aldridge in connection with its representation of LPL in this litigation; right?

A: Yes.

Q: Now, I see that you're being paid a sum of $350 an hour for the services that you provide to LPL's counsel in connection with this litigation; correct?

A: Yes.

Q: That includes your — the testimony that you are giving here today; right?

A: Yes.

Q: It includes the time you spent

Page 1401

preparing for your depositions in this case; right?

A: Yes.

Q: Exhibit 118 is a letter confirming that the McKenna, Long & Aldridge firm is acting as your lawyer in connection with your deposition in this case; right?

A: Yes.

Q: Now, are you paying McKenna, Long & Aldridge's fees for their representation of you in this case?

A: No.

Q: As stated in paragraph two on the first page of this Exhibit 118, LPL — it says, "LPL will pay your legal fees and costs in connection with this representation on your behalf," right? So LPL is paying McKenna, Long & Aldridge's legal fees in connection with its representation of you in this case; right?

A: Yes.

Q: And you have no responsibility for paying McKenna, Long & Aldridge's fees for representing you as your attorney in this case; right?

Page 1402

A: No.

Q: Are transistors switching elements?

A: Yes.

Q: What's your understanding of the meaning of a switching element?

A: A switching element —

Q: Sorry to interrupt you. I mean, of course, within the meaning of your patent, the invention that you patented.

Please, go ahead.

A: A switching element is a device that normally has high impedance at normal operating voltages and low impedance under high potential across it.

Q: So, in your view, a diode is a switching element within the meaning of the invention in your '002 patent?

A: Yes.

Q: When the resistor's resistance is high, it will be a poor electrostatic discharge shunt; right?

A: Can you define "high resistance"?

Q: Probably not as well as you can,

Page 1403

but what is your understanding, if we were talking about how you would have to have high resistance to isolate the guard ring, what did you have in mind? What — what range?

A: It would have to be, you know, very high the way we used it. I can't give you an exact number, but it would — it would probably be — I'm just guessing off the top of my head, ten to eight ohms since you have many, many of these in parallel.

Q: Mr. Holmberg, do you generally agree that materials used in thin-film processing generally fall into three categories according to their resistivity to charge flows, conductors, insulator, and semiconductor?

A: Can you state that again? I'm sorry.

Q: Certainly. Would you agree that materials used in thin-film processing generally fall into three categories according to their resistivity to charge flows, the three categories being first conductors; second, insulators; and third semiconductors?

Page 1404

A: Yes.

Q: What are typically conductor materials?

A: Generally metals, aluminum, binary metals like nichrome, copper.

Q: ITO?

A: ITO.

Q: What are typical semiconductor materials — well, what are typical insulator materials?

A: Silicon dioxide, silicon nitride, anodic oxide, titanium oxide.

Q: And what are typical semiconductor materials?

A: Germanium silicon, germanium silicon alloys, gallium, arsenide, just to name a few.

Q: Is chromium an insulator?

A: Chromium is a conductor.

Q: Is chromium a semiconductor?

A: No.

Q: Is silicon a conductor material? Have you ever heard anyone refer to silicon as being a conductor material?

Page 1405

A: No.

Q: Conductor and semiconductor materials, these are different materials; right?

A: There could be a close overlap with some materials.

Q: But these are two different categories of materials; right?

A: Yes, generally.

Q: In a liquid crystal display product, you cannot replace amorphous silicon with conductor material, can you?

A: I'm sorry. Repeat that again.

Q: Yes. In an LCD product, in a liquid crystal display product, you cannot replace an amorphous silicon with a conductor material; right?

A: It depends what the application is.

Q: Well, conductors and semiconductors in LCD products are not the same; right?

A: No.

Q: In a TFT, if you replace the amorphous silicon, the semiconductor material

Page 1406

with a conductor material, such as aluminum, the TFT would not work; right?

A: That is correct.

Q: And, likewise, if you replace a conductor material in a TFT with a semiconductor material, then the TFT would not work; right?

A: I wouldn't say that's true all the time.

Q: But, generally, that's — that's true, though; right?

A: You could have a highly-doped semiconductor material act as a source drain material.

Q: So, generally, in an LCD product, you cannot replace a conductor

material like —[16] like chromium with a semiconductor material such [17] as amorphous silicon?

[18] A: Generally not.

[19] Q: Conduct — and that's because [20] conductors and semiconductors are not [21] interchangeable in LCD products; right?

[22] A: Again, yeah, I think you have to [23] be more specific for what applications. Like I [24] said, sometimes there are some overlap depending

Page 1407

[1] on what the exact application is.

[2] Q: But, as a general matter, that —[3] that's — that's probably an understood [4] principle in thin-film processing; right?

[5] A: Yes.

[6] (End of videotape testimony.)

[7] MR. RHODES: Your Honor, at this [8] time we move into evidence DTX 8, 12, 14, 15 and [9] 16.

[10] THE COURT: All right. They'll be [11] admitted subject to a later objection.

[12] MR. RHODES: And Your Honor, our [13] next witness is Dr. Webster Howard.

[14] MS. CORBIN: Good morning, [15] Dr. Howard.

[16] THE CLERK: Please state and spell [17] your full name for the record.

[18] THE WITNESS: Webster E. Howard.

[19] THE CLERK: Could you spell that, [20] please.

[21] THE WITNESS: First name, [22] W-E-B-S-T-E-R. Middle initial E. H-O-W-A-R-D.

Page 1408

[1] WEBSTER E. HOWARD, Ph.D., [2] the deponent herein, having first [3] been duly affirmed on oath, was [4] examined and testified as follows:

[5] DIRECT EXAMINATION

[6] BY MS. CORBIN:

[7] Q: I'd like to start this afternoon, [8] Dr. Howard, with explaining some of your [9] credentials and experience, your educational [10] background.

[11] A: Yes

[12] Q: Starting first with your [13] educational background. Could you tell the jury [14] what that is?

[15] A: Yes. I received a bachelor's [16] degree in physics from Carnegie Mellon [17] University. And I received both a master's [18] degree and a Ph.D. in physics from Harvard [19] University.

[20] Q: When you were receiving your Ph.D. [21] at Harvard, were you specializing in any [22] particular aspect of physics?

[23] A: Yes, I was specializing in [24] semiconductor business.

Page 1409

[1] Q: And in what year did you receive [2] your Ph.D.?

[3] A: In 1962.

[4] Q: After you completed your education [5] by getting your Ph.D., did you perform any [6] military service?

[7] A: Yes, I did. When I was at [8] Carnegie Mellon, I was in the reserve officer [9] training core. And so after my education was [10] finished, I entered the Army.

[11] Q: And what was your role in the [12] Army?

[13] A: Well, I was a signal core officer. [14] And after initial training, I was assigned to a [15] laboratory. And in that laboratory, I was still [16] doing research on semiconductors.

[17] Q: And when did your military service [18] end?

[19] A: In 1961.

[20] Q: And following your military [21] service, what was your first employment?

[22] A: My first employment after military [23] service was I joined the IBM T.J. Watson [24] Research Center.

Page 1410

[1] Q: What is IBM T.J. Watson Research [2] Center?

[3] A: Well, the Watson Research Center [4] is kind of a think tank within IBM. The whole [5] lab is staffed and managed by scientists and [6] engineers.

[7] And it was set up to give those [8] people quite a bit of freedom to explore [9] innovative technologies that could be of use to [10] IBM for future products as well as present [11] products.

[12] Q: And were you employed at IBM for [13] 32 years?

[14] A: Yes, I was.

[15] Q: And was the entire period at the [16] T.J. Watson Research Center?

[17] A: It was.

[18] Q: And when you began your work at [19] the IBM T.J. Watson Research Center, what was [20] the nature of your research and work endeavors [21] at that time?

[22] A: Well, when I joined the company, I [23] was in an exploratory technology device group, [24] technology group in semiconductors. The job was

Page 1411

[1] to develop new devices, new materials for [2] semiconductive devices.

[3] Q: And at some point during your [4] employment with IBM, did your research involve [5] flat panel displays?

[6] A: Yes, it did.

[7] Q: When did that work begin?

[8] A: Well, in 1973, I took a job as a [9] manager of exploratory display project, which [10] initially was mostly involved in plasma [11] displays, which were just beginning to be [12] introduced at that time.

[13] And then as time went on, I got [14] more interested as things began to develop in [15] the outside world, in the liquid crystal [16] displays and active-matrix crystal displays.

[17] There was a gradual transition to [18] that technology ultimately being my total focus.

[19] Q: Is there any relationship to your [20] background in semiconductor physics to your [21] interest in active-matrix LCDs displays?

[22] A: Well, yes. It was kind of natural [23] since I had a lot of experience in [24] semiconductors and semiconductive devices, that

Page 1412

[1] the idea of using semiconductive thin film [2] transistors to make a really good display was [3] something that I thought where I could attribute [4] to the company.

[5] Q: And what was your role in IBM's [6] getting involved in the active-matrix LCD [7] display area?

[8] A: Well, I was the one that really [9] started the whole thing. I was — I started [10] using every opportunity I could to make the case [11] for this technology.

[12] I was convinced very early that it [13] was going to be quite important. And so I just [14] kept working on colleagues and management until [15] I over the time garnered more and more support [16] to increase the level of activity in that until, [17] you know, ultimately we went forward with it.

[18] Q: And when did IBM make the decision [19] to become actively developed in research and [20] development in active-matrix LCD displays?

[21] A: Well, the decision was made at the [22] top of the corporation in late '85.

[23] Q: And once they made that decision, [24] what was your role in that research and

Page 1413

[1] development?

[2] A: Well, when the decision was made, [3] it was also made that we should — that research [4] should involve IBM Japan in pursuing it, and [5] that we should seek a Japanese partner. And so [6] I was leading the research effort, and I became [7] then the technical leader of the IBM effort.

[8] Q: And what Japanese company did IBM [9] and IBM Japan partner with in this

the reason — he's talking about the interconnection.

Q: What part of the diagram is he talking about?

A: Oh, this part here. This Line A is what he was referring to as the interconnection.

Page 1484

Q: The interconnection of what?

A: In this case, all of the gate lines. And he was asked: Is it all the gates lines? And he said, yes.

Q: Okay. And then what did he have to say about the reason for function of the interconnection?

A: Well, he was asked: What's the reason to connect all the gate lines on Line A?

And he said that my understanding is that there are two reasons: The first reason is that if the electrostatic occurs, these lines are there to distribute and discharge the said electrostatic. And number two reason is that this is for the purpose of testing, so that we could apply a voltage to this line and use this for testing purposes.

Question: So for testing, if you apply a voltage on one gate line, that voltage will be applied to all the gate lines; correct?

Answer: As far as I understand that, yes. That is correct.

Q: Okay. Thank you. If it was only — if the function

Page 1485

of the interconnection was merely to provide a conductive path for ESD protection, would there be any need to have an interconnection at all?

MR. GOODWYN: Objection; leading.

THE WITNESS: No.

THE COURT: I'm going to overrule the objection. But you have to be careful not to have the answer in the question.

MS. CORBIN: Okay.

THE WITNESS: No, because there are other things.

Just as the earlier solutions that were shown, you can short all the lines to the outer guard ring directly.

BY MS. CORBIN:

Q: But if you do that, can you test — can you perform this two-point bulk test?

A: No, you can't. But you distribute the charge that way.

Q: And did Dr. Holmberg — what did Dr. Holmberg say was the first thing he tried when he was trying to provide electrostatic discharge protection?

A: Well, he said the first thing he tried was just shorting everything together, but

Page 1486

he wanted to be able to test.

Q: And could he do that when he was just shorting all the lines to the guard ring?

A: No.

Q: Does CPT interconnect substantially all of its gate lines?

A: No, they don't.

Q: Does CPT interconnect substantially all of its source lines?

A: No, not at all.

Q: Is CPT able to test any of its products using the two-point bulk test that you've described?

A: No, CPT cannot.

Q: Why not?

A: Because the lines are not interconnected. There's not one point where you can put the same voltage on all the lines.

Q: How does CPT test its products?

A: They test with a different technique, line by line testing. You have to go to each line with two points to determine whether it's continuous.

And you have to go to each line

Page 1487

and, you know, each set of lines to check crossover points.

Q: And when you talk about each line, for example, I don't think anybody's touched on this. On an average display, they have a 15-inch display.

How many gate lines are there?

A: Well, typically, in a 15-inch, you would have 768 gate lines on an XGA display.

Q: What about — how many source lines i?

A: That would be 300 — 3,072.

Q: So are you saying that CPT must test each one of those several thousands of lines in each individually?

A: That's what I'm saying.

Q: May I have Defendants' Exhibit 8, please.

Again, referring to Dr. Holmberg's testimony from yesterday, during his testimony he was referring to this figure, particularly the one on the bottom. And do you recall what he said about whether or not using this configuration you would be able to perform the

Page 1488

two point volt test?

A: Yes, he was asked if you had this configuration and then the same configuration on the source lines, could you test. And he said no, you couldn't.

Q: Okay. Thank you. Now, before we move on, I want to talk to you about schematics and their usage. How are schematics used in electrical engineering fields?

A: Oh, they're just used widely to summarize the electrical characteristics of a circuit.

Q: And if you pick up any electrical engineering semiconductor device textbook, would you find schematics?

A: Oh, absolutely.

Q: Would that same thing be true of reference books?

A: Yes. Yeah. In textbooks, reference books.

Q: Did you find any use of schematics in the prior art that we're going to be discussing later today?

Page 1489

A: Yes.

Q: May we see slide 55, please. And what do we see here and where is this figure from?

A: This is from an application by Kawamura and he's shown here, for instance, a layout for making diodes and then he illustrates electrically what he's doing up here by this schematic.

Q: And what is shown — what is the schematic up there on the top?

A: It's two diodes, it's the same pair of diodes that we see over and over again in CPT's products.

Q: Now, slide 56. During his deposition, did Dr. Schlam himself make a schematic?

A: Yes, he did. He made this one which we can blow up, in connection with the CPT's diodes connecting a transfer pad to the guard ring and they are the same design that's used on the lines themselves. And so he labeled — he showed them as pairs of diodes and he labeled them as shunt switching elements. And

Page 1490

he showed the guard ring here as composed of three elements in his view. And then he indicated where he associated the resistance.

Q: Okay. Could we see slide 59, please.

Dr. Schlam during his testimony indicated that there was something misleading about using schematics to

discuss electrical [9] circuits, for example, the CPT products. Do you [10] agree with that?

[11] **A:** No, I don't.

[12] **Q:** And again, this is the slide we [13] looked at just a little bit earlier. And did [14] Dr. Schlam agree that these schematics that we [15] see again later today were accurate schematics [16] of the mask files of the two configurations that [17] CPT uses to couple its gate lines and source [18] lines to the outer ring?

[19] **A:** He did agree.

[20] **Q:** And did he agree that those were [21] electrically equivalent?

[22] **A:** Yes.

[23] **Q:** I want to turn now to the Court's [24] claim construction with respect to the term we

Page 1491

[1] find in Claim 1, interconnecting. Can we see [2] slide 60, please. And can you explain or tell [3] us what the Court's construction of that term [4] is?

[5] **A:** The Court determined that the term [6] as used in interconnecting as used in Claim 1 [7] means electrically connecting with conductors.

[8] **Q:** Does CPT do that?

[9] **A:** No, CPT does not do that.

[10] **Q:** Can we see slide 61, please. [11] And what do we see on the two mask [12] files on the upper portion of the slide?

[13] **A:** Yeah. These are the top — these [14] are top views of the plate and that same [15] microscopic view we talked about earlier. So [16] you're looking down and this shows the diodes, [17] where you see this light blue, that's the [18] undoped amorphous silicon, that's the essential [19] part of the diode.

[20] And down here, we have kind of a [21] see through view to look down at the gate metal [22] just to show that this gate metal is actually [23] gate or source lines, but in this case it's [24] source lines, but they are connected with gate

Page 1492

[1] metal at this point. So gate metal does not [2] travel, does not connect all the way through to [3] the guard ring. The only connection is through [4] the diodes themselves.

[5] **Q:** And that's true for every CPT [6] product?

[7] **A:** And that's true for every CPT [8] product that you have this kind of [9] configuration, where this does not connect [10] directly with this, but only through the diodes.

[11] **Q:** And again, you mention that the [12] two blue lines traveling through each of the [13] diodes horizontally there, what type of material [14] is that?

[15] **A:** That's undoped amorphous silicon.

[16] **Q:** When you say undoped, you mean?

[17] **A:** Pure amorphous silicon.

[18] **Q:** What type of material is pure [19] amorphous silicon?

[20] **A:** It's a semiconductor.

[21] **Q:** What is a diode?

[22] **A:** A diode is like a valve or a gate. [23] In this case the diodes are designed only to [24] conduct when the voltage reaches some particular

Page 1493

[1] level. Think in plumbing terms, it's a pressure [2] relief valve. It's sitting there not allowing [3] anything to go until you get too much pressure, [4] in this case too much voltage, and then it opens [5] up and current can flow, or water can flow in [6] the pipe case.

[7] **Q:** Can you show us using the mask [8] files here when an electrostatic discharge would [9] occur, what would happen? What would be the [10] flow of the electric current?

[11] **A:** Well, when the electrostatic [12] discharge comes, when voltage builds up here, [13] this diode begins to conduct. Let's say it's [14] positive voltage, so the positive voltage would [15] be this diode here. This diode begins to [16] conduct through the silicon through the guard [17] ring, the guard ring is like a storm sewer, so [18] the charge can dissipate around the display once [19] it gets into the guard ring.

[20] **Q:** So the flow of the charge would [21] come through the gate through the diode to the [22] guard ring. Can you show us again that path?

[23] **A:** The path would be through the [24] diode to the outer guard ring, and then from the

Page 1494

[1] outer guard ring it can go around to the rest of [2] the display.

[3] **Q:** Okay. Could we see 62, please. [4] Do you recall that during [5] Dr. Schlam's testimony he showed a little video, [6] 3D video of in his view what the flow of the [7] electric current would be in the event of an [8] electrostatic discharge?

[9] **A:** Yes, he did. That's the one shown [10] here.

[11] **Q:** What is your opinion about the [12] accuracy of the dashed lane which he's indicated [13] as the flow of current in the event of an [14] electrostatic discharge?

[15] **A:** Well, in the event of a discharge, [16] a charge originating here would indeed flow up [17] this way and over here, and it would go — if [18] that diode started to turn on because this was a [19] very high voltage, then the charge would flow [20] through here. But at that point it's connected [21] to the outer guard ring, so it's going to go out [22] to the storm sewer here, to the outer guard [23] ring.

[24] **Q:** Why? Why would that be the path

Page 1495

[1] of the electric current?

[2] **A:** Because that's the path of least [3] resistance. To go in this direction requires [4] another barrier of voltage to get over this hump [5] to go on in that direction, so there is no [6] reason for the charge to flow here, it will flow [7] directly to the outer guard ring.

[8] **Q:** What's creating the barrier for [9] the current flowing?

[10] **A:** This amorphous silicon.

[11] **Q:** And again, what kind of a material [12] is amorphous, pure amorphous silicon?

[13] **A:** It's semiconductor, it's not a [14] conductor.

[15] **Q:** And in the flow the way you have [16] indicated, the pink layer that's here, what type [17] of material is that?

[18] **A:** That's a conductor.

[19] **Q:** But —

[20] **A:** That's source drain metal.

[21] **Q:** Does the current after [22] electrostatic discharge ever flow in the way [23] depicted here?

[24] **A:** It could only flow that way if you

Page 1496

[1] also had a higher voltage here or something like [2] that, and then it would go — then this might be [3] the lowest point, but that's so unlikely, I [4] can't imagine that happening.

[5] **Q:** Even if you — so as I understand [6] you, you don't agree with the flow that [7] Dr. Schlam has indicated on this slide?

[8] **A:** No, I don't. No.

[9] **Q:** But I'm asking you now to assume [10] that for argument sake the flow of current did [11] flow in the manner that he's depicted here, is [12] electrical connections in that case made with a [13] conductor?

[14] **A:** No, because in that case it still [15] has to go through two semiconductor layers.

[16] **Q:** Now, we talked about these [17] different type of materials and I think we need [18] to step back and explain that now. So what is [19] the difference between a semiconductor and a [20] conductor?

[21] **A:** Well, a semiconductor is just a [22]

conform to the definition of the Court.

Q: Okay. And before we explain that, can you tell us why specifying a resistance is important in electrical design?

A: Well, in electrical design, it's always important, because when you specify the resistance, you're going to determine what kinds of current can flow in a given circuit with certain voltages. So it's one of the things that one typically specifies in a circuit.

Q: And can you substitute a diode in a design which calls for a specified resistance?

A: No.

Q: Why not?

A: It's a different component.

Q: Okay. So turning to your opinion as you just stated that a diode is not a

Page 1544

resistance as defined by the Court, can you explain why that is? And did you prepare a slide to help in assisting you in that?

A: Yes.

MS. CORBIN: Slide 99.

THE WITNESS: Well, the first point is that the diode doesn't have a specified resistance. If you look at the characteristics of a diode, the resistance of the diode changes dramatically.

One of the requirements of the diode is that it's a switch, which means when the voltage is low, it's off. That means the resistance has to be very high.

But then you want it to turn on above some voltage and allow current to flow. So the resistance has to drop rapidly above some voltage for it to work as in the on state of the switch.

So the resistance is changing all along here. And a —

Q: So do I understand you to be saying that as the voltage increases, that the resistance is changing in the diode?

Page 1545

MR. GOODWYN: Objection; leading.

THE COURT: I'll sustain the objection.

THE WITNESS: Yeah. Well, I thought I just said when you increase —

THE COURT: Doctor, hold on a second.

MS. CORBIN: You sustained the question?

THE COURT: Rephrase your question.

BY MS. CORBIN:

Q: Can you just explain for us, again, what the relationship is between the resistance, and the diode, and any voltage being applied?

A: Yes. The resistance of the diode will be different for every voltage applied.

So as I said, it's design as a switch. So for higher voltage, it should have a low resistance. For low voltages, it should have a very high resistance.

Q: Okay. And how does that compare to a circuit component that has a specified

Page 1546

resistance?

A: A circuit component that has a specified resistance will remain the same for various voltages.

Q: Okay. I want to now turn to Slide 100. This is Plaintiff's Exhibit 15, Page 2.

Do you recall Dr. Schlam's testimony regarding this document?

A: Yes, I do.

Q: Is this document that you had seen in your review of materials as you prepared your opinion?

A: Yes.

Q: And what is the document itself?

A: Well, it's part of the specification of the product, the module product. In this case it's the 15XP array.

Q: And did you review the product specifications for each of the accused products here?

A: Yes, I did.

Q: And earlier Dr. Schlam testified that he relied on this document in reaching his opinion that CPT's products do have a specified

Page 1547

resistance. Was this specification important in the formation of your opinion about whether CPT's products had a resistance?

A: Not really.

Q: Why not?

A: Because when I look at this, it just tells me what is the shape of the transistor to be used in this product, and not — it doesn't say anything about the nature of it except that it's a TFT diode.

Q: How does CPT specify its diodes, the design of its diodes?

A: It specifies them in this way, it specifies the width of the semiconductor in that channel and the distance across the channel designated as L.

Q: And when you're talking about the channel, what are you talking about?

A: If you remember back on the mask files, the blue stripes, these quantities refer to the — in our terms the W and L are inverted in semiconductor technology, but what most people would say is the length of that blue stripe is indicated as W here as let's say 50

Page 1548

microns, and then L, the distance across that gap is indicated to be five microns. And then the other devices are — in this case it's a wider device.

Q: Could we see, for example, slide 72 so we can show that diode.

So when we're talking about the width and the length as you just discussed it, what are we talking about when we see the picture?

A: Well, this is the width along here. And this is the length. As I say, it's kind of opposite to what most people would say, but that's the way it's done in semiconductors.

Q: And back to slide 100. So in other words, the width and the length, is that a dimensional specification or an electrical specification?

A: It's a dimensional specification.

Q: Is that the same thing, a dimensional specification and an electrical specification?

A: No, not at all.

Q: In your view, is Dr. Schlam's

Page 1549

reliance on this document to find resistance as defined by the Court appropriate?

A: No, it doesn't make a TFT diode conform just by looking at this document.

Q: And I think when Dr. Schlam was on the stand, he referenced the Chinese characters or Japanese characters that follow the TFT in those lines that have been culled out, and they showed a translation of those characters as resistance, TFT resistance. Does that impact your view as to whether CPT's diodes have the resistance as defined by the Court to be applied in this case to the infringement analysis?

A: No, it doesn't. I'm not a linguist, and in any case, I look at the structure of the device and I know from experience then what the nature of that device is, and it really doesn't matter what they call it even in English, if they show what it is.

Q: And when you actually look at the diode itself, again, is there any specified resistance as defined by the Court?

A: No. In my view the diode does not constitute a resistance as defined by the Court.

Page 1550

Q: And just one more time, the width and the length from those two dimensions, are you able to determine — and now I'm not talking about resistance as defined by the Court, but I'm just talking about resistance as a property, with just those two dimensions, are you even able to know what the resistance of the diode is?

MR. GOODWYN: Objection. Leading.

THE COURT: I'm going to overrule the objection because it doesn't fully implicate the answer, but again, you have to be careful.

THE WITNESS: No, it says right here, with only that width and length channel data, you can't even calculate the current-voltage relationship, because you need other information.

Q: Just in conclusion, then, in your opinion do the CPT diodes meet the resistance limitation of Claims 1 and 8 when you define resistance as the Court has provided?

A: They do not.

Q: So I want to turn now to Dr. Schlam's second theory of how one might find

Page 1551

the resistance in the CPT product. And do you recall that his second theory is that the resistance can be found in the ITO, the indium tin oxide found in the outer guard ring?

A: Yeah, within the outer guard ring.

Q: So have you prepared some slides first to show the jury what the outer guard ring consist of?

A: Yes, what we're talking about.

Q: Can we see slide 101, please.

A: Here you see the top view of the outer guard ring. And the dark blue is the indium tin oxide. So if you look down from the top, you just see indium tin oxide, although actually it's transparent, it's not blue.

Q: When you say top down view, what are you meaning?

A: We're looking down from above the glass at the structure as indicated by the mask files, so if we take some of that off.

Q: Next, please.

A: Can I have the next, please. Actually it just renders it sort of transparent, the blue lines indicate that ITO is there, but

Page 1552

now you can see that there are two metals, the red metal is the gate line or row line metal, and the yellow metal is the source drain metal or column line metal. So both of those are present as well as the ITO that's sitting on top of them.

Q: And the next slide.

A: And the ITO is used to connect the source drain metal to the gate metal, and it's done through all these contact holes because you remember we keep talking about insulators and the gate lines normally has an insulator over it, so it's insulated from the source drain metal and the source drain metal has an insulator over it before ITO comes down, but when you want to connect these, you have to make holes in the insulator. The green spots here represent places where you have made holes in the insulator so that you can connect one metal, one conductor to the other.

MS. CORBIN: Okay. So, and could we go back to the first slide in that series? Two back.

BY MS. CORBIN:

Page 1553

Q: So, again, the blue, what is the blue depicting?

A: So the blue is the Indium tin oxide that comes down last. And it connects those two metals, the red metal and the yellow metal. It connects the metals through the contact holes.

Q: Okay. And so, in your view, what comprises the outer guard ring?

A: The outer guard ring comprises the layer of gate metal, the layer of source drain metal, and the ITO.

Q: And you read Dr. Schlam's deposition. Did you find any places in that deposition where Dr. Schlam agreed that the outer guard ring was comprised of multiple metal layers?

A: Yes. He did say that at one point.

Q: And let's maybe start first with the figure that he drew, and that is Defendants' Exhibit 73.

What did you understand him to be depicting here as the outer — as the guard

Page 1554

ring?

A: Well, this bracket shows that he considers the outer guard ring to consist of this line here which schematically represents the source drain metal, the yellow metal in the picture. And this green here, this metal here, which corresponds to the gate metal.

And then he shows them connected by resistance.

Q: What is that?

A: He attributes that resistance, that's the ITO, that connection.

Q: And then again — thank you. In the deposition itself, did you find other places where he referenced the outer guard ring as consisting of multiple gate levels?

A: I think there was at least one more place.

MS. CORBIN: Could we have transcript Page 21, please?

THE WITNESS: Okay. I guess the first part of the question is missing.

But the answer is, Let me make

Page 1555

this schematic a little more accurate. As I pointed out, there are — were two resistances, two resistances in the actual structure. The schematic I drew only represents one of them.

So if you'll allow me, the guard ring really is composed of two different metals and there is a resistance, in addition to the resistance of the shunt switching element, namely the ITO that connects the two metals together in the guard ring, which is also a resistance. So there are two sources of resistance.

There are two sources of resistance. One of them being the resistance of the silicon in the diodes and the other one being the ITO that connects the two metallizations that comprise the totality of the guard ring.

MS. CORBIN: And could we see transcript Page 19, please?

BY MS. CORBIN:

Q: Is this another place that you identified where Dr. Schlam was describing what comprised the outer guard ring?

Page 1556

A: Yes. So the question is: So, the part, just so I can be clear, when we are referring now to Exhibit 14, Page 2 of Dr. Howard's report, that schematic, you're agreeing that it's an accurate schematic representation of the spark gaps and the diodes, but you're saying it's leaving out this ITO layer that you have mentioned, which would be found in the outer ring, which is shown here; right?

Is that the ITO that you are speaking of or not?

Answer: The ITO I'm speaking of is the ITO coupling the two metallic components of the outer ring.

BY MS. CORBIN:

Q: I want to turn now to an explanation about how the ITO and the guard ring functions in CPT's products. And did you prepare a series of slides to assist in that discussion?

A: Yes. Could I have the first one, please?

MS. CORBIN: 104.

Page 1557

THE WITNESS: Okay. We're going back to these mask files. And see, this is an outer ring, and many, many electrodes shown here. And we zoom in on that.

And you can see that all along here, there are thousands, literally thousands, 10,000 of these pairs of connections between the two, the red metal and the yellow metal using the ITO.

Q: And this is — what is the structure that we're seeing there where it has the green circles?

A: That's — that's the outer guard ring.

Q: Okay.

MS. CORBIN: The next slide, please.

BY MS. CORBIN:

Q: And what is the function of the ITO jumpers in the outer guard ring?

A: Well, the function is to connect those two metals and to provide as much connectivity as possible in the outer guard ring. And also by connecting those two metals,

Page 1558

you allow these diodes to be properly made.

Q: Okay. And when you use the term ITO jumper, what does that mean?

A: Well, it means, as was used before, it's a conductive connection. And it's intended to tie these two things together electrically.

Q: And, again, the Indium tin oxide, what type of material is that?

A: It's a conductor as we showed on that chart.

Q: Okay.

MS. CORBIN: Next slide.

BY MS. CORBIN:

Q: Is the ITO jumpers — sorry. Are the ITO jumpers resistances as defined by the Court?

A: No, they're not resistances as defined by the Court.

Q: Why not?

A: Because they don't have a specified resistance, and they don't serve to minimize the current in an electrostatic discharge.

Page 1559

Q: And what is the intent of CPT when it has 10,000 of these ITO jumpers as you've described in one panel in the outer ring?

A: Well, the thousands of connections are designed to make the connection as good as possible, that is with as low resistance as possible, given the constraints of how much room they have.

Q: And when — what is the effect of these ITO jumpers when you have, for example, electrostatic discharge coming through the gate lines?

A: Well, the effect of tying the two metals together and adding the ITO, which also is carrying current all along the line, is to provide a greater path for the electricity that's coming out in electrostatic discharge, so you want to provide as much conductance as possible in the outer guard ring and you do that with all the materials you have available which is the gate metal, source drain metal and ITO, so you pile them all up and connect them together and that gives you the most conductance that you can get.

Page 1560

Q: If CPT had intended to use the ITO jumpers to minimize the current surge of electrostatic discharge, how might it have designed and used ITO jumpers?

A: Well, if you were trying to introduce a significant resistance, you would only use two of these contact holes. You would put one of them on one end, and the other would be on the other end, the far end of the line, and that way the current would have to flow all the way down the ITO from one end of the line to the other.

Q: And when you're referring to that, what are you referring to on the panel, not in the picture, but on the panel, on the LCD panel?

A: You're referring to the length of the display or the width of the display. That's the length of these guard rings, and so you would have that long length of ITO making up —

Q: And in that case, what would the resistance as a property, not as defined by the Court, but as a property mean?

A: In the case of going all the way down the line?

Page 1561

Q: Yes.

A: I didn't calculate that.

Q: But in relationship to any resistance as a property, not as defined by the Court, of these holes as we see in the mask file?

A: Oh, it would be much higher.

Q: So what is the implication —

A: It would be thousands of times higher, I know that much.

Q: So what is the implication of putting many of these holes in close relationship to one another in the outer guard ring?

A: Well, the implication is to minimize the resistance, that's the intent.

Q: Now, could we see slide 108, please.

Have you actually calculated what the resistance of the ITO jumpers is in the CPT products in the outer guard ring?

A: Well, yes, I took a couple of examples and I used a handbook formula for calculating the resistance between two circular

Page 1562

contacts, and that allowed me to estimate that the total resistance between those two lines of metal is much less than a tenth of an ohm.

Q: And again, what was the resistance described in the one embodiment that is in the '002 patent?

A: Yeah. The embodiment in the '002 patent is a hundred thousand ohms. So this is at least a million times smaller resistance than what Mr. Holmberg was talking about.

Q: And did you describe — did you prepare a slide to show the difference in the resistance of the '002 patent and the resistance as claimed by Dr. Schlam in the ITO jumpers of the CPT product?

A: Yes.

Q: Could we see slide '79.

A: Yeah. This is just showing again that there is quite a difference in the basic structure as described by the '002 patent, you have these interconnected lines and you have this coupling resistance, and over here in the CPT design you have got coupling by diodes and then out here you have got this really small

Page 1563

resistance, you know, in this case this is a hundred thousand ohms, you got this tiny resistance somewhere in the structure of the outer guard ring.

Q: Now, where is the resistance physically located as spelled out in the '002 patent and depicted in your chart on the left?

has some level of resistance, everything has some level of conductivity, except for superconductors which have no resistance.

Q: And does CPT utilize superconductors in the diodes?

A: No. No one was figured out how to get superconductors into the displays, unfortunately; maybe some day.

Q: So just to illustrate that point that the resistance is found in every substance, can we just — can you just describe for us say

Page 1577

in the gate line, what is the resistance of the gate lines that we have been talking about?

A: The resistance of a typical gate line is in the kiloohm range. Obviously it depends on the size of the display and the design and width of the lines, et cetera, the thickness, but you know, my experience typically they operate around a 10,000 ohm level for reasons that we don't need to get into.

Q: So the gate lines themselves would have a 10,000 ohm level. How does that relate to the .1 ohm resistance that you described in the ITO jumpers?

A: Well, that's obviously much higher, 10,000 compared to a 10th of an ohm is a pretty slight resistance, a thousand compared to a tenth of an ohm.

Q: The way in which the ITO jumpers are used in CPT products where you have 10,000, for example, of those in one outer guard ring, what is the effect of that on current flow in the event of electrostatic discharge?

A: Well, it would have essentially no effect. It would be a negligible affect in

Page 1578

comparison to these other resistors that are present.

Q: Could we see slide 111, please. When people use ITO in the LCD industry in the manner in which CPT has used that, how does that comport with resistance as defined by the Court?

A: Well, I don't know of any case in the LCD industry where ITO is used to minimize the current from electrostatic discharge. ITO is generally used to provide as much conductance as possible.

Q: I would like to see slide 120, please.

So based on the discussion that we've just had, is it your opinion — strike that.

Do any of CPT's products contain the resistance of step four of Claim 1?

A: No, they don't.

Q: And could you summarize for us the reasons why you say that?

A: Well, first of all, in terms of this part four here, they don't have the three

Page 1579

distinct structures. The diodes don't constitute a resistance under the Court's definition because they don't have a specified resistance. And both the diode and the ITO actually serve to maximize current from ESD and not minimize it.

Q: And then if we could quickly look at step five, which is removing said guard ring and row and column interconnections prior to completion of the display. In your view, do any of CPT's manufacturing methodologies that produce the accused products here do that step?

A: They do not.

Q: Why not?

A: Because they don't have the interconnections.

Q: So in summary, then, in looking at the totality of Claim 1, slide 121, can you summarize for us why you opine that CPT's products do not infringe Claim 1?

A: Because they don't provide the interconnecting as required by the definition. And in this portion they don't have the interconnection, therefore, they can't do

Page 1580

everything, but they also don't have a resistance that conforms to the Court's definition. And again, this is not valid because there are no interconnections. So as a result, none of these is met.

Q: Okay. So I want to talk about Claim 8 now. Is Claim 8 a dependent or independent claim?

A: Claim 8 is a dependent claim.

Q: And what does it mean to be a dependent claim?

A: It means that it contains the elements of the claim from which it depends.

Q: Could I please have slide 121 back, please.

And what claim does Claim 8 depend from?

A: Claim 8 depends from Claim 1.

Q: And so does it include all the limitations that we have just gone through for Claim 1?

A: That's the meaning of it, it includes all these limitations and then adds additional ones.

Page 1581

Q: So what is your opinion with respect to whether any of CPT's products that are accused here infringe Claim 8?

A: Well, if they don't infringe Claim 1, they cannot infringe Claim 8. So that's very simple.

Q: What is your opinion about —

A: So, therefore, they do not infringe Claim 8.

Q: So if I have understood, we have gone through all the reasons why CPT does not infringe Claim 1 or Claim 8, and I want to switch gears here for a minute and ask you, Dr. Howard, were you asked to consider whether noninfringing alternatives exist to the '002 patent?

A: Yes, I was.

Q: And can you tell us what are noninfringing alternatives, what that term means?

A: Well, a noninfringing alternative is a way of making the product that would not infringe the '002 patent.

Q: And are there any non-infringing

Page 1582

alternatives that you are aware of?

A: Well, I mean, one of them is the CPT structure, which I just said doesn't infringe.

Q: And in addition to that, are there any other non-infringing methods of which you are aware?

A: Yes. I'm aware of other alternatives.

Q: And could you give us an example of one of those?

A: Well, one example is use of what's called chip on glass technology.

Q: And can you explain what that is?

A: Yes. All these displays have to be connected to the outside world eventually. And typically that's done on the edge of the panel with a flexible connector.

And the flexible connector carries on it a silicon chip that provides the voltages to each of the lines to which it's connected in accordance with the — what the computer is sending out as a picture.

And in chip on glass, those chips

Page 1583

that normally would be on the flex are placed directly onto the glass. And so you have a smaller number of connects that have to be made to the glass

of the invention is to provide protection from electrostatic discharges between said row and column activation lines during manufacture of the displays and thereafter?

A: Text on page three. When the assembly of the active matrix is completed with connections being made into peripheral circuits and the like it's preferable to connect wiring A, which is that ring, to a ground potential as well. The protection circuit according to the present invention will then work not only against electrostatic charges, but also against surges that enter through the peripheral circuits.

So this is describing how this is to be used even after you have the peripheral circuits on there, which means after manufacture.

Page 1637

Q: And then the last one is the Oritsuke reference. We could look at slide 157.

What is the Oritsuke reference?

A: Once more it's a Japanese patent application publication dated January 1988.

Q: Are you surprised that so many of these references are Japanese?

A: Not really, not having worked with the Japanese during that period, that's where the action was, really.

Q: And in terms of prior art, do foreign references from countries other than the U.S. constitute prior art?

A: Oh, yes. Yes. References from anywhere in the world can constitute prior art.

Q: If we could go back to slide five. And if we could zoom in on the middle portion of that document there. Do you see where it says, " Foreign Patent Documents"?

A: Yes.

Q: Were any foreign patent documents considered by the examiner when he was considering whether or not to issue the claims of the '002 patent?

Page 1638

A: It appears not.

Q: I'm sorry, going back to 157. And what does the Oritsuke reference teach?

A: Well, again, it teaches a method to provide a flat panel display that protects active components from electrostatic destruction during and after manufacture, and this is accomplished by forming an inner guard ring coupled to row and column lines via diodes.

Q: And do we see that inner ring on that figure from Oritsuke there?

A: Yes, that's shown there in yellow, the inner ring. And then the diodes are shown in I guess red coupling each line, so each row and each column to that ring through diodes.

Q: And what's the significance of the elements that have been highlighted in blue?

A: Well, the significance of that is that this reference to the external circuitry, and so this indicates that this is intended for protection after the display has been completed and has its external circuitry.

Q: And you have prepared a chart on

Page 1639

Oritsuke as well?

A: Yes.

Q: 159. And other than in the Figure 5 we have just shown, was there other support for the formation of an inner electrostatic discharge guard ring on the substrate?

A: Figure 1, page seven, so here again the red indicates inner ring.

Q: Can you also see the inner ring coupled to said row and column lines via shunt switching elements?

A: Yes. Again, here the blue is highlighting the shunt switching elements coupling each line, rows and columns to the inner ring.

Q: What are those switching elements?

A: They're transistors.

Q: And finally to provide protection from electrostatic discharge between said row and column activation lines during manufacture of the displays and thereafter, how do you know that this is intended to be providing protection from electrostatic discharge?

Page 1640

A: The electrostatic discharge —

Q: I think in your chart, could you go back to 159. It indicates pages four and five.

A: Right.

Q: Page four, please.

A: Yeah. This indicates the object of the present invention is to provide a flat display that protects active components from electrostatic destruction, so that's a protection element.

Q: How do you know that it's intended, that ring, to remain after manufacture?

A: Because it talks about the problem with displays as described above is destruction or the deterioration in the performance of active components by static electricity created during the manufacturing process or during installation to or removal from a panel. So that means after the manufacturing process.

Q: Okay. Have we now walked through each of the four references that form the basis of your conclusion that Claim 8 is obvious?

Page 1641

A: Yes.

Q: I want to turn to the fact that you understand, Dr. Howard, that Claim 8 includes all the limitations of Claim 1, plus the additional limitations found in Claim 8?

A: Yes, I do.

Q: So do you understand, how many rings are found within Claim 8?

A: Within Claim 8 there are two rings.

Q: And what are those rings?

A: The outer guard ring and the inner guard ring.

Q: And do you find the outer guard ring and the inner guard ring in any of the four — together in any of the four references that we've just discussed?

A: Not together.

Q: And how is it, then, that you are able to conclude that nevertheless the combination of these four references, the Kawamura and Okawa reference that had the outer guard rings and the Yudasaka and the Oritsuke that had the inner guard rings, render this

Page 1642

claim obvious?

A: Well, because one of ordinary skill in the art working at that time, if presented with these inventions, would recognize that each offered benefit, and they could clearly have been combined. And since there was so much concern about yield and perfection of displays, it would be, to me, obvious to one of those people to combine them.

Q: And when you say that there was so much concern about the perfection of these displays, what do you mean?

A: Well, it's even pointed out in the '002 patent that, you know, one — one — damage to — one damaged element can mean the destruction of the whole display in a display like this.

Q: When you say "damaged element"

, you're referring to one pixel or one picture element?

A: The one-pixel element, or even worse if you have a damaged intersection.

Q: Okay. And what was the nature of the problem to be solved by the Kawamura and

Page 1643

Okawa references that teach the outer guard ring?

A: The nature of the problems we solved was this damage from electrostatic discharge.

Q: And what was the nature of the problem to be solved by the Yudasaka and Oritsuke references, which teach about the inner guard ring?

A: The same problem.

Q: And what was the time period where people of ordinary skill in the art, again, now prior to the '002 invention, recognition of what time period you should protect against ESD protection?

A: Could you go through that again?

Q: Yes. Was there knowledge of those of skill in the art that you needed to protect against ESD during manufacturing?

A: Yes.

Q: And did we see that in the references that we just discussed?

A: Yes. All those different

Page 1644

references have their recognition as prior to that.

Q: And was there recognition in these references and acknowledged by those of skill in the art that there was a need to protect against electrostatic discharge after manufacturing?

A: Well, certainly some of the references recognized that. I'm not sure whether everyone recognized that, but we have two references that recognized that.

Q: And in this field of active-matrix displays, given the problems that you've discussed of one damaged element causing you to discard the entire display, what would be — what would provide the motivation for one of ordinary skill to combine these references?

A: Well, if you have such a severe problem and people are offering two different approaches to the problem, and it's clear that you could combine them, then I think an engineer who's being measured on how many defects are coming out of the line might be motivated to combine them.

Q: Were there other redundancy

Page 1645

techniques that you're aware of, in the active-matrix display area, that were added to protect the components of the display?

A: Well, yes. In fact, in the '002 patent, there's a discussion of redundancy techniques to make the appearance of the display be more resistant to presence of some defects.

Q: And when you add the outer ring to the inner ring, is there any additional variable cost involved in the manufacture of an active matrix display that has both rings?

A: No. There's not necessarily any additional costs.

I mean, the same process. It's just changing the masks basically.

Q: And once changed, the mask, as you manufacture that product, is there anymore variable cost in producing an active-matrix display with two rings as opposed to one that only had one outer — either the outer ring alone or the inner ring alone?

A: No. When you process a plate through one of these lines, it's costing you so much to process it. And it's independent of the

Page 1646

pattern.

If you put it through there, and all you put on there is your name or something, it's going to cost the same amount of money.

Q: When you — you mentioned these mask steps, and are those mask steps used to form the gate lines and source lines that are part of the — of Claim 1?

A: The masks. Yes, those are the ones that we went through in the mask files.

Q: And they're also used to form the diodes that couple those lines —

A: Yes.

Q: — to the outer guard ring?

A: Yeah. All —

Q: Sorry.

A: All the steps that we showed in the mask files.

Q: And those same — are those same mask steps used to form the outer ring and the inner ring?

A: Yes.

Q: Are any additional mask steps involved?

Page 1647

A: No.

Q: In your opinion, when one of ordinary skill in the art, prior to the time of the '002 invention, and let me step back.

How are you familiar with what one of ordinary skill, as defined by you, would have known prior to the time of the '002 invention?

A: Well, I was working there at that — in those years, working on the subject, and certainly had a lot of contact with the people that would fit that definition of one of ordinary skill in the art.

Q: And as they were working on active-matrix displays?

A: Yes.

Q: Okay. So in your view, would one of ordinary skill in the art prior to the time of the '002 invention, who had before him the four references you've discussed, the Kawamura, Okawa, Yudasaka and Oritsuke references, need to do any experimentation whatsoever in order to combine an inner ring and an outer ring in one display?

A: No.

Page 1648

Q: Would it require any inventive contribution on that person's part?

A: No. And in fact, if they — if someone thought it was an invention, I would explain to him that it wasn't.

Q: Did the combination of the inner and outer rings lead to any surprise or unexpected results in your mind?

A: No. That's another point.

Q: Do you understand what the term hindsight means when it's talked about in connection with a validity analysis?

A: Yes.

Q: What does it mean?

A: Well, it means I shouldn't be applying knowledge that I've gained, let's say, in recent years to what might have been going on back then.

Q: And are you doing that in forming your opinion?

A: No, because I was there.

Q: So are you considering only what one of ordinary skill knew prior to the time of the '002 invention?

Page 1649

A: Yes.

Q: And again, you reviewed Dr. Schlam's deposition?

A: Yes.

Q: And was there anything in that deposition that led you to believe that he agreed with you that the combination of this inner and outer guard ring was obvious?

[9] A: Yes. He did make comments to that [10] effect.

[11] Q: And did you identify the portion [12] of the transcript —

[13] A: Yes.

[14] Q: — that you thought supported that [15] view?

[16] A: Yes, I did, [17] MS. CORBIN: Can we have the slam [18] clip, please? Dr. Schlam's clip?

[19] (Beginning of videotape excerpt:)

[20] Q: So you are aware — do these test [21] results form part of the basis of your opinion [22] that the combination of the inner ring and the [23] outer ring together provide more ESD protection [24] than the inner ring alone?

Page 1650

[1] A: Not necessarily test results. [2] It's something that's quite obvious in the world [3] of electronics. And again, the best thing I can [4] do is come up with analogies, raincoat and [5] umbrella.

[6] (Conclusion of videotape excerpt.)

[7] BY MS. CORBIN:

[8] Q: Do you recall — what else did [9] Dr. Schlam have to say about the raincoat and [10] the umbrella.

[11] A: I think he explained that analogy [12] earlier that if it's raining and someone offers [13] you two forms of protection, you might take an [14] umbrella. You might use a raincoat.

[15] But if you're really concerned [16] about getting wet, it would be obvious that [17] you'd use both.

[18] Q: And how does that apply to whether [19] it would have been obvious to one of ordinary [20] skill in the art to combine the inner ring and [21] the outer ring in the four references that we've [22] discussed.

[23] A: Well, you can think of the outer [24] ring as the umbrella and the inner as the

Page 1651

[1] raincoat. They both provide protection in a [2] slightly different way.

[3] That's complimentary. One is [4] during manufacture, one is after manufacture.

[5] The outer ring can be made to [6] provide protection at a lower voltage than would [7] be acceptable for an inner ring. So that's the [8] complimentary aspect.

[9] Q: And in your view, does that fact [10] provide motivation to one of ordinary skill to [11] combine these references?

[12] A: Yes.

[13] Q: Okay. In conclusion, then, Dr. [14] Howard, can you just sum up for us, again, what [15] is your opinion with respect to whether any one [16] of CPT's products infringe Claims 1 and 8 of the [17] '002 patent?

[18] A: Well, I guess the way to say it is [19] if Claim 1 is stretched to be — cover the — I [20] guess, I don't want to say that.

[21] Q: Let me ask the question. I'm [22] asking you about infringement right now.

[23] A: Yeah, I was getting —

[24] Q: I know we've been going at this a

Page 1652

[1] long time.

[2] A: Invalidity infringement.

[3] Q: So I'm asking you right now —

[4] A: In terms of invalidity, I think I [5] said it earlier that the — on one hand, you've [6] got the references of Oritsuke and Yudasaka for [7] the inner ring, and the outer ring references of [8] Okawa and Kawamura.

[9] So it's obvious to combine those. [10] And if it's obvious, then it's invalid.

[11] Q: Okay. And with respect to Claim [12] 1, then, what is your view about the obviousness [13] of Claim 1?

[14] A: Well, again, if Claim 1 is [15] determined to cover diodes, then it's not really [16] obvious that it's anticipated by the prior art.

[17] Q: And you do understand that that is [18] LPL's contention that the resistance, the diodes [19] are the resistance?

[20] A: Yes.

[21] Q: So that's validity. [22] Turning, again, to infringement. [23] What is your opinion as to whether any of CPT's [24] products infringe Claims 1 and 8 of the '002

Page 1653

[1] patent?

[2] A: None of them infringe.

[3] MS. CORBIN: I have no further [4] questions. Thank you, Dr. Howard.

[5] Your Honor, at this time, I'd like [6] to move into evidence Defendants' Exhibit 6, 1, [7] 73, 2, 3, 4, 5, 6, 9, and 38 and 37.

[8] THE COURT: All right. They're [9] admitted subject to later objection.

[10] MS. CORBIN: And also Exhibit 8, [11] Your Honor, sorry, I would like to move that, [12] Exhibit 8 also into evidence.

[13] THE COURT: All right. It will be [14] admitted.

[15] CROSS-EXAMINATION

[16] BY MR. GOODWYN:

[17] Q: Hello, Dr. Howard. [18] I believe you testified at the [19] beginning of your direct examination that you [20] have been retained by Chunghwa; is that correct?

[21] A: CPT, right.

[22] Q: And are you being paid for your [23] testimony today?

[24] A: Yes, I am.

Page 1654

[1] Q: How much are you being paid?

[2] A: I'm being paid for my time at a [3] rate of $250 an hour.

[4] Q: How many hours have you worked for [5] Chunghwa or any of the defendants since you have [6] been retained?

[7] A: I would have to estimate, I [8] haven't totaled it up recently, but I have to [9] estimate about 200 hours.

[10] Q: Does that include the time that [11] you spent preparing for trial over these last [12] couple of weeks?

[13] A: Yes.

[14] Q: Now, you spent quite a bit of time [15] this morning discussing both validity and [16] infringement; is that right?

[17] A: Yes.

[18] Q: And you understand that those are [19] two separate analyses; right?

[20] A: I do.

[21] Q: And so let's — to try to avoid [22] confusion, let's just take each of those [23] analyses one at a time and we'll try to step [24] through those and we'll apply the Court's claim

Page 1655

[1] construction to both of those analyses. Okay?

[2] Let's look at Howard 32. [3] Actually let me try Howard 21, [4] this might speed things through. Howard 21. [5] How about 121. Sorry about that.

[6] Okay. Here we go. Would you [7] agree with me, Dr. Howard, that the three [8] limitations that you argued are not met really [9] boils down to interconnecting and resistance?

[10] A: Well, the interconnecting is [11] appearing in several places, so I don't know if [12] — if you're just saying those interconnecting [13] and resistance themselves, we've also outlined [14] here the interconnecting affects the others, [15] too.

[16] Q: In the element forming an outer [17] electrostatic discharge guard ring, [18] interconnected row and columns refers back up to [19] the step before, interconnecting —

[20] A: That's correct.

[21] Q: And then the last one, [22] interconnections again refers back up to [23] interconnecting?

[24] A: That's correct.

Page 1656

[1] Q: You got interconnecting and [2] resistance in red, so those are really the